



RF EXPOSURE ANALYSIS

<u>Product</u>	<u>FCC ID</u>
MGM13P02 802.15.4/BT5.0 Module	QOQMGM13

Analysis for FCC, portable use

Standalone SAR test exclusion considerations are defined in the KDB 447498 Chapter 4.3.1. 1-g head or body SAR exclusion threshold is defined with formula

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. separation distance, mm.})] * (\sqrt{f(\text{GHz})}) \leq 3$$

For MGM13P02 the maximum peak TX power including tolerances is 12.16 dBm for the Zigbee and 11.69 dBm for the Bluetooth. The maximum duty cycle of Zigbee is 66% and the duty cycle relaxation can be calculated by $10 * \log(0.66) = -1.8\text{dB}$. For the BT the maximum duty cycle is 98% and similarly the duty cycle relaxation is $10 * \log(0.98) = -0.09\text{dB}$. Thus, the maximum TXP including tolerances is 14.5 mW and maximum TX frequency is 2.48 GHz. Using separation distance of 7.7 mm with the formula above results

$$\left(\frac{14.5\text{mW}}{7.7\text{mm}} \right) * \sqrt{2.48} = 2.97 < 3$$

Thus MGM13P02 meets the SAR exclusion criteria with 7.5 mm separation and SAR evaluation is not needed.

Analysis for FCC, mobile use

$$S = \frac{E.I.R.P}{4\pi R^2} = \frac{23.7\text{mW}}{4\pi * (20\text{cm})^2} = 0.00471\text{mW} / \text{cm}^2$$

E.I.R.P (mW)	Evaluation distance R (cm)	Power density S at prediction frequency (mW/cm ²)	MPE limit for uncontrolled exposure at prediction frequency (mW/cm ²)	Verdict
23.7	20	0.00471	1	PASS